OIPE IAP58
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/823,951
Filing Date	April 13, 2004
First Named Inventor	Frank W. Daly, Jr.
Art Unit	2857
Examiner Name	Anthony Gutierrez
Attorney Docket Number	543-99-036 CIP

Total Number of Pages in This Submission: 40

ENCLOSURES (*Check all that apply*)

- [X] Fee Transmittal Form
  - [X] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
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Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Charles J. Rupnick (Reg. No.: 43,068)
Signature	Charles J. Rupnick
Date	December 19, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.	:	10/823,951
Inventor	:	Frank W. Daly, Jr.
Filed	:	April 13, 2400
TC/A.U.	:	2857
Examiner	:	Anthony Gutierrez
Docket No.	:	543-99-036 CIP
Customer No.	:	00128

Confirmation No.: 5451

Appeal Brief Under 37 C.F.R. § 41.37

Mail Stop: **Appeal Brief-Patents**
Commissioner for Patents
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Sir:

Pursuant to the Notice of Appeal dated October 17, 2005, please enter the following Appeal Brief:

(1) REAL PARTY IN INTEREST

The real party in interest is Honeywell International, Inc., 101 Columbia Road, P.O. Box 2245, Morristown, NJ 07962, the assignee of record of the entire interest of the above captioned application.

(2) RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are known to either appellant or the appellant's legal representative which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) STATUS OF CLAIMS

Claims 1 and 3-38 are pending and stand rejected.

Claims 1 and 3-38 are appealed.

(4) STATUS OF AMENDMENTS

The status of the amendment filed subsequent to final rejection is that the amendment has been entered.

The Applicant has incorporated said amendment in the Appendix of Claims attached hereto.

(5) SUMMARY OF INVENTION

In the invention as presently claimed, an apparatus and method for predicting the future state of a weather condition relative to an aircraft are disclosed. The claims of the present invention are to methods and electronic circuits implementing the methods that predict future weather relative to the threat posed to the safety of flight. Preferably, the a warning is generated as a function of a forecast intensity of a storm cell as compared with an intended phase of flight at predicted intersection of the aircraft with the storm cell. Figs. 7 and 9 illustrate embodiments of the method and apparatus, respectively. See, e.g., Summary of the Invention at page 12, lines 13-29; see, also, Specification at page 18, lines 19-28.

The method and apparatus determine two or more gradations of threat and generate different warning signals as a function of such gradations of threat. See, e.g., Specification at page 18, line 29-page 19, line 31.

The method and apparatus determines gradations of threat as a function of storm cell intensity and phase of flight. See, e.g., replacement paragraph beginning at page 12, line 22 as set forth in Preliminary Amendment filed on April 13, 2004, at page 2, and new paragraph beginning at page 19, line 16 as set forth in Preliminary Amendment filed on April 13, 2004, at pages 2-4.

The invention of amended independent Claim 1 is a method for predicting the future state of a weather condition relative to the threat posed to the safety of flight, the method including forecasting information describing a weather condition relative to an aircraft, retrieving a phase of flight of the aircraft, and generating a warning as a function of comparing the weather condition forecast information and the aircraft phase of flight.

The invention of dependent Claim 3 is the method of claim 1, including forecasting an intensity of a storm cell sufficient to threaten safety of flight, and generating a warning as a function of a predicted intersection with the storm cell threatening to the safety of flight.

The invention of dependent Claim 4 is the method of claim 1, including determining a coincidence of the aircraft and the weather condition. The invention of dependent Claim 5 recites a further limitation to the method of Claim 4 as retrieving a flight path of the aircraft and comparing the flight path with a location of the weather condition. The invention of dependent Claim 6 recites a further limitation to the method of retrieving a flight path of the aircraft of Claim 5 as retrieving an intended phase of flight at coincidence of the aircraft and the weather condition, and also recites a further limitation to the method of generating a warning as generating a warning as a function of the weather condition forecast information and the intended phase of flight at coincidence. The invention of dependent Claim 7 recites a further limitation to the method of generating a warning of Claim 6 as generating a warning both as a function of determining an intensity of the weather condition at coincidence, and comparing the intensity of the weather condition with the intended phase of flight of the aircraft at coincidence.

The invention of dependent Claim 8 is the method of claim 1 reciting a further limitation to the method of forecasting information describing a weather condition relative to an aircraft as forecasting information describing a track of the weather condition. The invention of dependent Claim 9 recites further limitations to the method of Claim 8 as further including the steps of: accessing a flight path of the aircraft; comparing the forecast track of the weather condition with the flight path; and predicting a coincidence of the flight path and the weather condition. The invention of dependent Claim 10 recites further limitations to the method of Claim 9 as further including the step of generating an alert as a function of the coincidence of the flight path and the weather condition.

The invention of dependent Claim 11 is the method of claim 3 reciting a further limitation to the method of comparing the weather condition forecast information and the phase of flight as determining a threat to the safety of flight as a function of the forecasted intensity of the storm cell as a function of an <u>intended</u> phase of flight of the aircraft at the predicted intersection with the storm cell.

The invention of dependent Claim 12 is the method of claim 8 reciting a further limitation to the method of forecasting information describing a weather condition as forecasting a weather radar image representative of the weather condition relative to the aircraft; and reciting a further limitation to the method of displaying information describing the forecast track of the weather condition as displaying the forecast weather radar image.

The invention of independent Claim 13 is a method for predicting the future position and intensity of a weather condition relative to an aircraft using a weather radar resident on-board the aircraft, the method including spatially and temporally mapping first and second weather radar images, predicting and displaying a future track of a weather condition as a function of the first and second weather radar images, retrieving a phase of flight of the aircraft, and determining a potential threat to the safety of flight and a severity of the potential threat as a function of comparing the weather condition and the aircraft's phase of flight.

The invention of dependent Claim 14 is the method of claim 13 reciting the further limitations of retrieving a stored flight path of the aircraft, comparing the flight path with the predicted future track of the weather condition, and determining a coincidence of the flight path and the weather condition. The invention of dependent Claim 15 recites a further limitation to the method of Claim 14 as generating a warning as a function of the coincidence of the flight path and weather condition. The invention of dependent Claim 16 recites further limitations to the method of Claim 15 as further limiting the first and second weather radar images as being respective first and second images representative of the weather condition; further limiting the step of comparing the first and second weather radar images as comparing first and second states of the weather condition; and recites a further limitation of forecasting a future state of the weather condition. The invention of dependent Claim 17 recites further limitations to the method of Claim 16 as further limiting the retrieving a phase of flight of the aircraft as retrieving an <u>intended</u> phase of flight of the aircraft at the coincidence of the flight path and weather condition; and as further

limiting determining a potential threat to the safety of flight as determining a potential threat to the safety of flight as a function of the future state of both the weather condition and the intended phase of flight. The invention of dependent Claim 18 recites further limitations to the method of Claim 17 as further limiting the generating a warning as being a function of the potential threat to the safety of flight. The invention of dependent Claim 19 recites further limitations to the method of Claim 18 as further limiting the displaying of the predicted future track of the weather condition as displaying one or more of a future position and a future intensity of the weather condition.

The invention of independent Claim 20 is a method for using an electronic circuit to predict the future position and intensity of a weather condition relative to an aircraft using a weather radar resident on-board the aircraft, the method including using the electronic circuit for referencing first and second recorded weather radar images to a common physical location, analyzing the first and second weather radar images, predicting a future track of one or more weather cells as a function of analyzing the first and second weather radar images, generating a signal representative of the predicted future track of the weather cells. Additionally, the method invention of independent Claim 20 includes displaying the predicted future track of the weather cells, and using the electronic circuit for accessing an intended flight path of the aircraft, accessing a phase of flight of the aircraft, predicting a coincidence of the intended flight path and the weather condition, and determining a potential threat to the safety of flight as a function of comparing: the coincidence of the intended flight path, the phase of flight, and the weather condition.

The invention of dependent Claim 21 is the method of claim 20 reciting the further limitation of the step of predicting a coincidence of the intended flight path and the weather cells as using the electronic circuit for comparing the predicted future track of the weather cells with the intended flight path.

The invention of independent Claim 22 is an electronic circuit for use with a weather radar system to predict the future state of a weather condition relative to an aircraft, the electronic circuit having a memory for storing a plurality of machine instructions, a processor coupled to receive a signal representative of a phase of flight of the aircraft and further coupled to the memory for accessing the plurality of machine instructions, the processor accessing a phase of

flight of the aircraft and executing the plurality of machine instructions to implement a plurality of functions, the functions including: accessing a first weather radar image generated relative to the aircraft; accessing a second weather radar image generated after the first weather radar image and having a similar relationship to the aircraft as the first weather radar image; referencing the first weather radar image to the second weather radar image; comparing the first and second weather radar images; forecasting as a function of the first and second weather radar images information describing a weather condition represented by the first and second weather radar images; and generating a warning as a function of comparing the phase of flight and the information describing a weather condition represented by the first and second weather radar images.

The invention of dependent Claim 23 is the electronic circuit of claim 22 reciting a further limitation of the plurality of functions as generating a video signal representative of the forecast weather condition information.

The invention of dependent Claim 24 is the electronic circuit of claim 22 reciting a further limitation of the processor as being further coupled to receive from a flight management computer a signal representative of the aircraft's intended flight path. Claim 24 also limits the machine instruction for forecasting information describing a weather condition as forecasting a future track of the weather condition; and further limits the plurality of functions as including functions for comparing the forecast track of the weather condition with the intended flight path, and predicting a coincidence of the intended flight path and the weather condition.

The invention of dependent Claim 25 is the electronic circuit of claim 22 reciting a further limitation of the forecasting information describing a weather condition as forecasting a state of the weather condition at or about the coincidence. The invention of dependent Claim 26 recites further limitations to the electronic circuit of Claim 25 as further limiting the function of generating a warning as generating a warning signal as a function of the coincidence, the phase of flight, and the state of the weather condition at or about the coincidence. The invention of dependent Claim 27 recites further limitations to the electronic circuit of Claim 26 as further limiting the processor is as being coupled to receive from a flight management computer a signal representative of the aircraft's intended phase of flight at or about the coincidence; and further limits the function of generating a warning signal as being further a function of the intended phase of flight. The invention of dependent Claim 28 recites further limitations to the electronic circuit

of Claim 27 as the electronic circuit being further limited by inclusion of a weather radar unit being coupled to the processor.

The invention of independent Claim 29 is an electronic circuit for coupling to a weather radar system on-board an aircraft to display weather information and forecast weather data relative to a phase of flight of the aircraft, the processor including a weather radar processor that is adapted to receive first and second weather radar return signals from a receiver portion of a weather radar system that is resident on-board an aircraft and to convert the first and second weather radar return signals into first and second weather radar image signals representative of weather information relative to the aircraft that is contained in the weather radar return signals; a memory that is coupled to the processor and that is adapted to receive and store the first and second weather radar image signals; a weather incident prediction function that is operated by the processor and is coupled to the memory to receive first and second different ones of the stored weather radar image signals, the weather incident prediction function being adapted to forecast future weather information relative to the aircraft as a function of the first and second stored weather radar image signals, and being adapted to generate a signal representative of the future weather information; and a threat prediction function that is operated by the processor and is coupled to receive a signal representative of a phase of flight of the aircraft and the signal representative of the future weather information, the threat prediction function being adapted to compare the future weather information and the phase of flight and to predict a threat to the safety of flight as a function of the comparison.

The invention of dependent Claim 30 is the electronic circuit of claim 29 reciting a further limitation of the storage of the weather radar image signals as being a function of time; and reciting a further limitation of the storage of the forecast of future weather information relative to the aircraft as also being a function of the time. The invention of dependent Claim 31 recites further limitations to the electronic circuit of Claim 30 as further limiting the future weather information as being information describing both a predicted future intensity and a predicted future track of one or more weather cells described by the weather information contained in the weather radar return signals. The invention of dependent Claim 32 recites further limitations to the electronic circuit of Claim 31 as further limiting the signal representative of a phase of flight of the aircraft as being a signal representative of an intended phase of flight of the aircraft. Claim 32

also recites further limitations to the weather radar processor of Claim 31 as being further adapted to receive a signal representative of an intended flight path of the aircraft. Claim 32 also recites further limitations to the weather incident prediction function of Claim 31 as being further adapted to predict a coincidence of the intended flight path and one or more of the weather cells. Claim 32 also recites further limitations to the threat prediction function of Claim 31 as being further adapted to predict the threat at the coincidence as a function of the predicted future intensity of the one or more of the weather cells and the intended phase of flight at coincidence.

The invention of dependent Claim 33 recites further limitations to the electronic circuit of Claim 31 as further limiting the weather radar processor as being adapted to receive a signal representative of an intended flight plan of the aircraft; and recites further limitations to the weather incident prediction function as being further adapted to predict a coincidence of the intended flight plan and one or more of the weather cells.

The invention of dependent Claim 34 is the electronic circuit of claim 29 reciting a further limitation of the weather radar processor as being further adapted to generate a warning signal as a function of the threat prediction function. The invention of dependent Claim 35 recites further limitations to the electronic circuit of Claim 34 as further limiting the weather radar processor as being further adapted to determine two or more gradations of threat and to generate the warning signal as a function of the two or more gradations of threat.

The invention of dependent Claim 36 is the electronic circuit of claim 29, further including a display that is coupled to the processor and is adapted to receive each of the weather radar image signals representative of weather information contained in the weather radar return signals and the signal representative of the future weather information, the display being a screen that is adapted to display each of the weather information contained in the weather radar return signals and the future weather information. The invention of dependent Claim 37 recites further limitations to the electronic circuit of Claim 36 as further limiting the processor as being further adapted to generate weather radar transmission signals. Claim 37 also recites further limitations to the electronic circuit of Claim 36 as having a transmitter that is coupled to receive the weather radar transmission signals from the processor, and to output the weather radar transmission signals to a radar antenna; and having a receiver that is coupled to receive weather radar return

signals from a radar antenna, and to output the received weather radar return signals to the processor.

The invention of dependent Claim 38 is the electronic circuit of claim 29 reciting a further limitation of the threat prediction function as being further adapted to determine a severity of said threat to the safety of flight as a function of said comparison of said future weather information and said phase of flight.

(6) ISSUES

1) Whether Claims 1 and 3-37 are unpatentable under 35 USC § 103(a) as being obvious over US Patent 5,974,360 to Otsuka, et al. in view of US Patent 5,615,118 to Frank, and further in view of US Patent 5,077,558 to Kuntman.

(7) GROUNDS OF REJECTION TO REVIEWED ON APPEAL

1) Claims 1 and 3-37 are rejected under 35 USC § 103(a) as being obvious over US Patent 5,974,360 to Otsuka, et al. in view of US Patent 5,615,118 to Frank, and further in view of US Patent 5,077,558 to Kuntman.

(8) ARGUMENT

1) Rejection of Claims 1 and 3-37 under 35 U.S.C. § 103

Claims 1 and 3-37 are rejected under 35 USC § 103(a) as being obvious over US Patent 5,974,360 to Otsuka, et al. in view of US Patent 5,615,118 to Frank, and further in view of US Patent 5,077,558 to Kuntman.

In the invention as presently recited in Claim 1, a method for predicting the future state of a weather condition relative to the threat posed to the safety of flight is claimed, the method including the limitations of: forecasting information describing a weather condition relative to an aircraft, retrieving a phase of flight of the aircraft, and generating a warning as a function of comparing the weather condition forecast information and the aircraft phase of flight. The present invention thus grades the severity of threats based upon the intensity of a storm cell in combination with the phase of flight during coincidence with the storm cell.

US Patent 5,974,360 to Otsuka, et al. teaches equipment for weather image prediction. See, e.g., Abstract.

US Patent 5,615,118 to Frank teaches an onboard aircraft flight optimization system that includes an onboard performance management computer, a control display unit, an infrared probe, a temperature probe, a weather radar, an inertial navigation system, and comparing apparatus. See, e.g., Abstract. The comparing apparatus of Frank compares a remote wind signal with a local wind signal, and compares a remote temperature signal with a local temperature signal, so as to determine a position remote from the aircraft where the remote wind signal is less than the local wind signal so that an altitude can be achieved that has less head wind and is therefore more economically efficient. See, e.g., Abstract.

US Patent 5,077,558 to Kuntman teaches an airborne wind shear detection radar having a transmitter for transmitting successive radar beams into airspace in front of an aircraft, and a receiver for receiving reflected signals. See, e.g., Abstract. The radar of Kuntman analyzes the received reflected signals in the frequency domain to determine if a wind shear condition exists in the airspace in front of the aircraft. See, e.g., Abstract.

As to claims 1, 13, 20, 22 and 29, the Office Action contends that Otsuka et al. discloses accessing a second weather radar image generated after a first weather radar image and having a similar relationship as a first weather radar image; spatially and temporally mapping the first weather radar image onto said second weather radar image; comparing the first and second weather radar images; and forecasting information describing a weather condition represented by the first and second weather radar images, citing column 1, lines 35-43 and Figs. 11, 12, and 13.

The Office Action further contends that Otsuka et al. further indicates that the method can be used in fields such as airplane operation and control, citing column 1, lines 53-62.

The Office Action admits that Otsuka et al. does not specifically disclose a method wherein weather radar images are generated by a weather radar resident on-board an aircraft.

The Office Action further contends, however, that Frank discloses a method wherein weather radar images are generated by a weather radar resident on-board an aircraft, citing column 4, lines 5-21 and column 7, lines 12-22. According to the Office Action, the method of Frank involves airplane operation and control by providing pilots with tactical information, including information about the severity of threats, such that the pilot may divert or take other corrective action, citing column 5, lines 19-23 and column 12, lines 15-33.

Accordingly, the Office Action further contends that it would have been obvious to one of ordinary skill in the art at the time of invention to modify Otsuka et al. in the manner of Frank in order to provide a pilot with a highly accurate forecast of a weather image so that the pilot can better choose appropriate action based on the forecast.

The Office Action further contends Frank further discloses an onboard flight path optimization system with an onboard control display unit that includes lights, and keys for displaying data and inserting commands related to different phases of flight (modes) , citing column 8, lines 38-59.

The Office Action admits that neither reference specifically teaches generating a warning reflecting a threat to safety as a function of a flight path and a phase of flight.

Rather, the Office Action contends that Kuntman discloses an airborne wind-shear detection weather radar, citing the Title, Figs. 1 and 2, and column 1, line 59-column 2, line 18, and teaches that an aircraft which traverses a microburst along a path will experience an increased headwind at the forward edge and an increased tailwind at the trailing edge which can result in a considerable loss of altitude at critical phases of flight. The Office Action contends that, in the cited passages, Kuntman incorporates wind shear detection as it relates to differing phases of flight and further discloses the use of an alert related to wind shear probability detection regarding severity of a threat, citing column 4, lines 27-30.

Accordingly, the Office Action further contends that it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate into the combination of Otsuka et al. and Frank (which the Office Action further contends is concerned with an enhanced onboard weather radar for use in an onboard aircraft flight path optimization system) with the ability to generate alerts for wind shear detection as they relate to critical phases of flight with respect to the position of an aircraft along a flight path, since taking phases of flight into consideration with respect to the position of an aircraft and to the position of turbulence along a flight path allows a pilot the flexibility to take greater caution during a higher probability of threat to safety, while eliminating the need to change a course when a threat to safety is at a minimum.

Applicant respectfully disagreed.

Applicant contends that Kuntman fails to provide the deficiencies of the Otsuka, et al. and Frank references. As discussed above, the Examiner admitted, and the Applicant agreed, that

Otsuka, et al. and Frank fail both to disclose or suggest <u>either</u> (1) accessing a phase of flight of the aircraft, or (2) generating a warning as a function of forecast weather condition information and the phase of flight, as recited in claim 1. Rather, the Examiner appears to rely upon Kuntman for these further limitations.

Kuntman teaches an airborne wind shear detection radar built into an <u>existing</u> weather radar with turbulence detection capability. Column 2, lines 7-12. Kuntman teaches that wind shear "can cause considerable loss of altitude at critical phases of flight." Column 2, lines 5-6. Kuntman also teaches that "wind shear detection can be incorporated as a <u>mode of operation of the weather radar</u> and therefore could be activated during the landing and takeoff phases of flight. Column 2, lines 12-15. The above quotations are set forth in Kuntman as follows:

> Figure. 1 illustrates wind characteristics of a wind shear condition associated with a microburst 10, wherein a down draft exists near the center 12 of the microburst 10 and the wind horizontally spreads out near a forward edge 14 and a trailing edge 16 of the microburst 10. As a result, <u>an aircraft 18 which traverses the microburst 10 along a path 20 will experience an increased head wind when it first contacts the microburst 10 at the forward edge 14.</u> As the aircraft 18 nears the center 12 of the microburst 10 it experiences a strong down draft and a shift from head wind to tail wind. As the aircraft 18 nears the trailing edge 16 of the microburst 10, it experiences an increased tail wind. This change from head wind to tail wind with a strong down draft is the characteristics of wind shear. It can cause considerable loss of altitude at critical phases of flight.
>
> Figure 2 illustrates a block diagram of a wind shear detection weather radar in accordance with a preferred embodiment of the present invention wherein wind shear detection capabilities are incorporated into an <u>existing</u> weather radar with turbulence detection capability. <u>Wind shear detection can be incorporated as a mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight. During the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available.</u>

Column 1, line 59-column 2, line 18 (emphasis added).

The Examiner relied on the above portion of Kuntman's teachings to suggest that it would have been obvious to incorporate the teachings of the Otsuka, et al. and Frank references with the Kuntman reference to make obvious the invention of claim 1.

Applicant respectfully disagreed.

Applicant contends that the Examiner is mistaken in interpreting the teachings of Kuntman. Applicant contends that Kuntman does not teach any "ability to generate alerts for wind shear detection as they relate to critical phases of flight with respect to the position of an aircraft along a flight path," as suggested by the Examiner.

The Examiner is not correct in asserting that Kuntman teaches an "ability to generate alerts for wind shear detection as they relate to critical phases of flight." Rather, referring to Kuntman at column 1, line 59-column 2, line 18 (reproduced above), it is obvious that Kuntman only teaches that "wind shear detection can be incorporated as a mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight." However, Kuntman goes on to teach that "during the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available." Thus, Kuntman teaches only that wind shear detection can be turned **on** during critical phases of flight, and turned **off** during other phases of flight.

Kuntman's ability to "activate" a wind shear detection device during critical phases of flight, when coupled with an ability to deactivate the detection device during non-critical phases of flight, cannot possibly disclose or suggest generating a warning as a function of forecast information describing a weather condition and the phase of flight, as recited in claim 1. Rather, Kuntman teaches only wind shear detection that operates when it is activated, and does not operate when it is not activated. Thus, Kuntman teaches only generating a wind shear warning as a function of whether the wind shear detection is activated or not activated. Kuntman does not disclose or suggest generating a wind shear warning as a function of phase of flight of the aircraft, as recited in claim 1.

Activating wind shear detection during critical phases of flight and de-activating it during non-critical phases is not anything like generating a weather warning as a function of the phase of flight, as recited in claim 1.

Furthermore, having wind shear detection active during critical phases of flight and de-activating it during non-critical phases is cannot suggest comparing weather condition forecast information and said phase of flight, as recited in claim 1.

In summary of this point, Kuntman's teaching that a wind shear detection device "could be activated" during critical phases of flight and could be de-activated during other phases of flight cannot possibly disclose or suggest generating a warning as a function of the phase of flight, as recited in claim 1. This requires making the leap of invention.

Furthermore, Kuntman's teaching that a wind shear detection device "could be activated" during critical phases of flight cannot possibly disclose or suggest generating a warning as a function of comparing weather condition forecast information and the phase of flight, as also recited in claim 1. Rather, this also requires making the leap of invention.

The Examiner, however, makes the leap of invention that it would be obvious to combine Kuntman's teaching of the ability to generate alerts for wind shear detection as they relate to critical phases of flight with respect to the position of an aircraft along a flight path with the teachings of Otsuka, et al. and Frank to make the present invention, since "taking phases of flight into consideration with respect to the position of an aircraft and to the position of turbulence along a flight path, allows a pilot the flexibility to take greater caution during a higher probability of threat to safety, while eliminating the need to change a course when a threat to safety is at a minimum."

Rather, in contrast to Otsuka, et al., Frank and Kuntman, claim 1 recites the two inventions of both generating a warning as a function of phase of flight, and generating the warning as a function of comparing the weather condition forecast information the phase of flight. Thus, the present invention grades the severity of threats based upon the intensity of a storm cell in combination with the phase of flight during coincidence with the storm cell, and generates a warning as a function of the phase of flight being one that is more or less sensitive to the forecast weather.

The Examiner must be using impermissible hindsight based on the instant invention to find that "generating a warning as a function of comparing said forecast information describing a weather condition and said phase of flight," as recited in claim 1, is made obvious by combining Kuntman's teaching of merely activating different modes of operation of the weather radar during different phases of flight with the teachings of Otsuka, et al. and Frank.

In response to the above arguments, the Examiner stated at page 9 of the final Office Action dated June 17, 2005, that "Kuntman discloses that wind shear when detected leads to an alert provided by the detection device. Kuntman also discloses that this is important for critical phases of flight, yet not important enough for non-critical phases of flight that the wind shear detection mode is not even activated. The Examiner therefore believes that since an alert is generated only when wind shear is detected and only when the device is in wind shear detection mode, and since the device is only in detection mode during critical phases of flight, the Examiner believes that "generating a warning as a function of the phase of flight" is disclosed in the Kuntman reference."

Merely reading the above counter-argument shows that the Examiner finds undisclosed inferences and then finds that the combination of the invention was made obvious by stringing together a combination of the undisclosed inferences. The Examiner clearly used impermissible hindsight based on the instant invention.

Furthermore, in response to the Examiner's counter-argument, Applicant points out again that electing to activate a process (windshear detection) during one phase of flight (critical phase) and electing to de-activate that process during another phase of flight (non-critical) appears to merely teach that a process can be active during one phase of flight and non-active during another phase of flight.

Furthermore, Kuntman's teaching of generating a warning when the process is activated is merely that: generating a warning <u>when</u> the process is activated. As taught by Kuntman, the warning is not generated when the process is not activated. Therefore, Kuntman teaches generating a warning as a function of whether the process is activated. Kuntman does <u>not</u> teach "generating a warning <u>as a function of the phase of flight</u>" as the Examiner asserts, only as a function of turning on the equipment.

Applicant reiterates that making the leap from generating a warning as a function of whether the process is activated, and electing to activate or de-activate the process to the "generating a warning <u>as a function of the phase of flight</u>," as recited in claim 1, requires a leap of invention. Therefore, the Examiner <u>must</u> be using impermissible hindsight based on the instant invention.

Furthermore, the Examiner does not show any teaching in any of Otsuka, et al., Frank and Kuntman that discloses or suggests "generating a warning as a function of comparing said forecast information describing a weather condition and said phase of flight," as recited in claim 1.

Rather, in the Advisory Action dated September 2, 2005, the Examiner merely states that "even if the reference did not compare A with B, as long a it compared A AND B, WITH anything else, the Examiner could still rely on the reference." However, the Examiner baldly misconstrues the claim language by suggesting that "comparing said forecast information describing a weather condition and said phase of flight," as recited in claim 1, could mean anything except comparing the "information" with the "phase of flight" since these are the only two subjects supplied by the claim to be operated on by the "comparing" function.

Furthermore, regarding the Examiner's statement that the reference could be relied upon if it compared A AND B, WITH anything else, the Examiner does not point out any reference that actually does compare the "information" and the "phase of flight" with anything else.

Also, the Examiner does not address the fact that dependent claim 7 clearly requires "comparing said intensity of said weather condition **with** said intended phase of flight at said coincidence."

The Proposed Modification Cannot Render The Prior Art Unsatisfactory For Its Intended Purpose

Kuntman teaches that, "Wind shear detection can be incorporated as a mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight." Column 2, lines 12-15.

Thus, Kuntman teaches exactly away from generating a warning as a function of forecast information describing a weather condition and said phase of flight, as recited in claim 1. Rather, Kuntman teaches disabling the weather radar during the landing and takeoff phases of flight, as shown by a full reading of the text of Kuntman, as follows:

> FIG. 2 illustrates a block diagram of a wind shear detection weather radar in accordance with a preferred embodiment of the present invention wherein wind shear detection capabilities are incorporated into an existing weather radar with turbulence detection capability. Wind shear detection can be incorporated as a

> mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight. During the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available. Column 2, lines 7-17 (emphasis added).

Thus, Kuntman teaches (1) wind shear detection capabilities are incorporated into an existing weather radar with turbulence detection capability; (2) wind shear detection could be activated during the landing and takeoff phases of flight; and (3) during the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available. Furthermore, wind shear detection is a different operation of the radar from weather detection. See, e.g., column 2, line 30-column 4, line 26.

Thus, as taught by Kuntman, weather detection and wind shear detection are different and **mutually exclusive** operations of the weather radar.

Thus, Kuntman suggests (1) operating wind shear detection during the landing and takeoff phases of flight, but (2) operating weather radar in its "normal modes" during cruise, climb and approach phases of flight. Kuntman suggests operating different modes of the radar during different phases of flight.

However, Kuntman fails to disclose or suggest generating a warning as a function of said forecast information describing a weather condition and said phase of flight. Rather, Kuntman teaches that an alert could be "generated any time a severe wind shear probability is detected." Column 4, lines 27-29. Thus, Kuntman does NOT tie generating an alert to phase of flight, as recited in claim 1. Rather, Kuntman only ties generating an alert to if the wind shear detection mode of the radar is being operated. Kuntman teaches generating an alert (1) if the wind shear detection mode of the radar is being operated, and (2) if the threat is a "severe wind shear probability." Phase of flight is not even relevant to generating an alert as taught by Kuntman. Kuntman only teaches best practice is to operate the wind shear mode during critical phases of flight. It is not operating as a function of phase of flight merely to choose to operate the radar in a different mode during different phases of flight, as taught by Kuntman.

As taught by Kuntman, if the wind shear mode is operating, an alert is generated; if it is not operating, the alert is not generated. Thus, Kuntman only teaches generating an alert as a

function of turning the wind shear mode ON or OFF, not as a function of phase of flight, as recited in claim 1.

Furthermore, Kuntman teaches that wind shear detection and weather detection are different and mutually exclusive operations of the weather radar. See, e.g., column 2, line 30-column 4, line 26.

Thus, as taught by Kuntman, only wind shear is operated during critical phases of flight. Weather detection is not even operated during critical phases of flight. As taught by Kuntman, an alert is only generated as a function of wind shear detection, and Kuntman fails to disclose or suggest generating any warning as a function of said forecast information describing a weather condition, as recited in claim 1.

In the Advisory Action dated September 2, 2005, the Examiner disagreed and stated that, "in the system of Kuntman, the wind shear detection mode is apparently only available when the weather detection mode is not active, but the Examiner does not consider this to suggest that in all conceivable systems, the action of weather detection could never be employed simultaneously with wind shear detection (and/or phase of flight information), but rather that this is simply not the case with respect to KUNTMAN's specific system. The Examiner therefore assumes that the Applicant can only be arguing that Kuntman teaches away from combination with Frank, with respect to ACTUAL SYSTEMS."

However, the "actual system" is the teaching of Kuntman. Kuntman did not teach "what might have been" as the Examiner appears to believe. Kuntman did not teach "all conceivable systems" as the Examiner would like to believe. No, Kuntman taught one system having mutually exclusive operation of the wind shear and weather detection modes.

Furthermore, Kuntman had good reasons for teaching mutually exclusive operation of the wind shear and weather detection modes.

Kuntman taught a system intended to be integrated with "known airborne weather radar systems used by the commercial and general aviation type aircraft." Column 1, lines 11-13. Kuntman elected to integrate the wind shear detection with the "known airborne weather radar systems" because "Most of the wind shear detection weather radar system's components are similar to typical airborne weather radar systems with turbulence detection capability." And require only "modifications of these standard components as well as a doppler signal processor

and a wind shear threshold processor." Column 1, lines 39-46. "FIG. 2 illustrates a block diagram of a wind shear detection weather radar in accordance with a preferred embodiment of the present invention wherein wind shear detection capabilities are incorporated into an existing weather radar with turbulence detection capability." Column 2, lines 7-17.

As discussed by Kuntman, wind shear detection can be incorporated as a mode of operation of the weather radar, but the two functions of wind shear detection and normal weather detection modes are mutually exclusive: "Wind shear detection can be incorporated as a mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight. During the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available." Column 2, lines 7-17. Also, wind shear detection and normal weather detection modes place different elevation tilt angle and azimuth sweep angle requirements on the radar, as well as different pulse widths of the transmitted signal, and different reflectivity detection capabilities. See, e.g., column 2, line 30-column 3, line 18.

Additionally, Kuntman taught that wind shear detection is paramount during take off and landing because "wind shear can cause considerable loss of altitude at critical phases of flight." Column 1, lines 29-32. Kuntman also teaches that wind shear "can cause considerable loss of altitude at critical phases of flight." Column 2, lines 5-6.

Frank teaches that weather detection is important during cruising to provide "the most economical flight path to a destination." Column 1, lines 5-20. The weather detection allows the pilot to avoid turbulence caused by different weather conditions in the path of the aircraft. See, generally, column 1, line 21-column 4, line 2.

Thus, it is logical that Kuntman teaches <u>mutually exclusive</u> operation of the wind shear and weather detection modes.

Furthermore, the court of *In re Gordon* found that, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) (Claimed device was a blood filter assembly for use during medical procedures wherein both the inlet and outlet for the blood were located at the bottom end of the filter assembly, and wherein a gas vent was present at the top of the filter assembly. The prior art reference taught a liquid strainer for removing dirt and water from gasoline and other light oils

wherein the inlet and outlet were at the top of the device, and wherein a pet-cock (stopcock) was located at the bottom of the device for periodically removing the collected dirt and water. The reference further taught that the separation is assisted by gravity. The Board concluded the claims were *prima facie* obvious, reasoning that it would have been obvious to turn the reference device upside down. The court reversed, finding that if the prior art device was turned upside down it would be inoperable for its intended purpose because the gasoline to be filtered would be trapped at the top, the water and heavier oils sought to be separated would flow out of the outlet instead of the purified gasoline, and the screen would become clogged.).

Here, similar to the liquid strainer in *In re Gordon*, the weather radar of Kuntman is clearly intended for the purpose of either <u>exclusively</u> forecasting weather information or <u>exclusively</u> detecting wind shear since Kuntman teaches that "Wind shear detection can be incorporated as a mode of operation of the weather radar and therefore could be activated during the landing and takeoff phases of flight. During the cruise, climb and approach phases of flight the radar could be operated in any of its normal modes currently available." Column 2, lines 7-17. Substituting the operations of the weather forecasting and wind shear detecting each <u>exclusive</u> of the other as taught by Kuntman would make the weather forecasting of Otsuka, et al. useless during critical phases of flight when the wind shear detecting is operating <u>exclusive of the weather detection operation</u>. Such inoperability in a weather forecasting device clearly intended to provide weather forecasting would obviously render the weather forecasting device of Otsuka, et al. inoperable for its intended purpose because the weather information would be <u>disabled</u> for weather forecasting.

Similarly, inoperability in a weather forecasting device clearly intended to provide maximum useful forward weather information would certainly render the performance management computer of Frank inoperable for its intended purpose because the weather information would be unavailable for determining the position remote from the aircraft where the remote wind signal is less than the local wind signal so that an altitude can be achieved that has less head wind and is therefore more economically efficient, as required by Frank.

THE PRIOR ART MUST SUGGEST THE DESIRABILITY OF THE CLAIMED INVENTION

Applicant argues above that, by teaching disabling the weather detection mode during the landing and takeoff phases of flight, and only enabling the wind shear detection mode during landing and takeoff phases of flight, Kuntman teaches exactly away from generating a warning as a function of forecast information describing a weather condition and said phase of flight, as recited in claim 1. Rather, as taught by Kuntman, weather detection and wind shear detection are different and **mutually exclusive** operations of the weather radar.

In the Advisory Action dated September 2, 2005, the Examiner stated, "The Examiner does not consider the reference to teach away because the combination of references by the Examiner is not a combination of systems, but rather a combination of the system of Frank (previously combined with Otsuka) and a TEACHING from Kuntman, not the SYSTEM of Kuntman."

However, the Examiner has not cited a TEACHING in Kuntman that discloses or suggests generating the warning *as a function of* the phase of flight. The TEACHING of Kuntman is to either activate or de-activate the function. When the function is activated, then Kuntman's device can generate a warning. Thus, the different and **mutually exclusive** operations of the weather detection and wind shear detection, which are the TEACHING of Kuntman, teach away from generating a warning *as a function of* said phase of flight, as recited in claim 1.

For at least the above reasons, the invention recited claim 1 as originally filed and as previously amended is clearly allowable over the combination of Otsuka, et al., Frank and Kuntman.

Claims 3-12 are allowable at least as depending from allowable claim 1.

Additionally, dependent claim 3 is allowable independently of claim 1 as reciting forecasting an intensity of a storm cell sufficient to threaten safety of flight, and as modifying the element of comparing said forecast information describing a weather condition and said phase of flight as further generating a warning as a function of a predicted intersection with said storm cell threatening said safety of flight. Applicant believes Otsuka, et al., Frank and Kuntman all fail to disclose or suggest any generating a warning as a function of a predicted intersection with said storm cell threatening said safety of flight, as recited in claim 3.

Kuntman's activating the wind shear detection during one phase of flight and de-activating it during a different phase of flight does not disclose or suggest forecasting that an intensity of a storm cell is sufficient to threaten safety of flight; and generating a warning as a function of comparing a storm cell threatening to the safety of flight and the phase of flight, as recited in claim 3 as modifying claim 1. The present invention grades threats based upon the intensity of the storm cell in combination with the phase of flight during a <u>predicted</u> intersection with the storm cell, and generates warnings as a function of whether the intensity of the storm cell will cause a threat to the safety of flight during the current phase of flight at the intersection.

For each of the above reason, claim 3 is believed to be allowable independently of base claim 1.

Additionally, dependent claim 11 is allowable independently of base claim 1 and intervening dependent claim 3 as reciting the generating a warning upon determining a threat to the safety of flight as a function of an <u>intended</u> phase of flight of the aircraft at said predicted intersection with said storm cell. The Applicant believes Otsuka, et al., Frank and Kuntman <u>all</u> fail to disclose or suggest <u>any</u> generating a warning as a function of determining a threat to the safety of flight as a function of said forecasted intensity of said storm cell storm cell in combination with an <u>intended</u> phase of flight of the aircraft at said predicted intersection with said storm cell, as presently recited in claim 11.

The Examiner has failed to point to any disclosure or suggestion in Frank as anything more than knowing which phase of flight is <u>current</u>. The Examiner only shows that Frank discloses an onboard control display unit that includes lights, and keys for displaying data and inserting commands related to different phases of flight, using the term "modes." For support, the Examiner cites Frank at column 8, lines 38-59, which reads as follows:

> Still yet another object of the present invention is to provide a onboard aircraft flight path optimization system wherein the onboard control display unit further includes an onboard climb light, an onboard cruise light, and an onboard descent light to *<u>indicate</u>* flight mode of the onboard performance management system computer. Column 8, lines 38-43 (emphasis added).
>
> Yet still another object of the present invention is to provide a onboard aircraft flight path optimization system wherein the onboard control display unit further

> includes an onboard climb key to display climb data and permit insertion of climb commands. Column 8, lines 44-48.
>
> Still yet another object of the present invention is to provide a onboard aircraft flight path optimization system wherein the onboard control display unit further includes an onboard cruise key to display cruise data and permit insertion of cruise speed commands. Column 8, lines 49-54.
>
> Yet still another object of the present invention is to provide a onboard aircraft flight path optimization system wherein the onboard control display unit further includes an onboard descent key to display descent data and permit insertion of decent rates and speeds. Column 8, lines 55-59.

Thus, Frank actually discloses <u>only</u> "an onboard descent light to <u>indicate</u> flight mode of the onboard performance management system computer." Column 8, lines 38-43 (above).

Furthermore, Frank discloses the onboard descent (DES) light 56 that <u>indicates</u> the flight mode of the onboard performance management system computer 26. Column 13, lines 57-60, which reads as follows:

> An onboard climb (CLB) light 52, an onboard cruise (CRZ) light 54, and an onboard descent (DES) light 56 <u>**indicate**</u> the flight mode of the onboard performance management system computer 26. Column 13, lines 57-60 (emphasis added).

Frank discloses the onboard descent (DES) light 56 that <u>*only*</u> <u>indicates</u> the flight mode of the onboard performance management system computer 26. Frank does <u>not</u> disclose or suggest doing <u>anything</u> *as a function* of phase of flight, as recited in claim 1. Rather, Frank teaches <u>only</u> *indicating* the flight mode of the onboard performance management system computer 26. Column 8, lines 38-43; column 13, lines 57-60.

Frank does not even make clear whether the "flight mode" indicated by light 56 is a flight mode of the aircraft, or rather, an operational mode <u>of the</u> <u>computer 26</u>, as Frank states.

Other portions of Frank cited by the Examiner also fail to provide these deficiencies. The Examiner cites that Frank teaches "an onboard climb key to display climb data and permit insertion of climb commands." Column 8, lines 44-48.

The Examiner cites that Frank teaches "an onboard cruise key to display cruise data and permit insertion of cruise speed commands." Column 8, lines 49-54.

The Examiner cites that Frank teaches "an onboard descent key to display descent data and permit insertion of decent rates and speeds." Column 8, lines 55-59.

As shown, Frank clearly teaches only display of data and insertion of commands, *without* any reference to "mode" or phase of flight, as recited in claim 1.

Thus, Frank does not disclose or suggest generating a warning as a function of said forecast information describing a weather condition and said phase of flight, as recited in claim 1.

Furthermore, Frank does not disclose or suggest generating a warning upon determining a threat to the safety of flight as a function of an "*intended*," i.e. future, phase of flight of the aircraft at said predicted intersection with said storm cell, as recited in claim 11.

As discussed above, Kuntman only teaches generating a warning when the wind shear detection device is activated, and failing to generate a warning when the device is de-activated. Thus, Kuntman does not disclose or suggest any activity as a function of an intended or "future" phase of flight, as recited in claim 11.

For each of the above reason, claim 11 is believed to be allowable independently of base claim 1 and intervening dependent claim 3.

Claim 13 differs in scope from allowable claim 1. However, the above arguments directed to allowable claim 1 are sufficiently applicable to claim 13 as to make repetition unnecessary. Thus, for each of the reasons above, claim 13 is believed to be allowable over the combination of Otsuka, et al., Frank and Kuntman.

Claims 14-19 are allowable at least as depending from allowable claim 13.

Claim 17 differs in scope from allowable dependent claim 11. However, the above arguments directed to allowable claim 11 are sufficiently applicable to claim 17 as to make repetition unnecessary. Thus, for each of the reasons above, claim 17 is believed to be additionally allowable independently of base claim 13 as reciting retrieving an "*intended*" or future, phase of flight of the aircraft at said coincidence of said flight path and said weather condition; and determining a potential threat to the safety of flight as a function of said future state of said weather condition and said intended or future phase of flight.

As discussed above in connection with allowable claim 11, Frank only discloses the onboard descent (DES) light 56 that <u>only</u> **indicates** the flight mode of the onboard performance management system computer 26. Column 13, lines 57-60 (reprinted above). As also discussed above, Kuntman only teaches generating a warning as a function of whether the wind shear detection device is activated or de-activated. Thus, Kuntman does <u>not</u> disclose or suggest <u>any</u> activity as a function of an <u>intended</u> phase of flight, as recited in claim 17.

For at least the above reasons, claim 17 is allowable independently of allowable base claim 13.

Claim 20 differs in scope from allowable claims 1 and 13. However, the above arguments directed to allowable claims 1 and 13 are sufficiently applicable to claim 20 as to make repetition unnecessary. Thus, for each of the reasons above, claim 20 is believed to be allowable over the combination of Otsuka, et al., Frank and Kuntman.

Claim 21 is allowable at least as depending from allowable claim 20.

Claim 22 differs in scope from all of allowable claims 1, 13 and 20. However, the above arguments directed to allowable claims 1, 13 and 20 are sufficiently applicable to claim 22 as to make repetition unnecessary. Thus, for each of the reasons above, claim 22 is believed to be allowable over the combination of Otsuka, et al., Frank and Kuntman.

Claims 23-28 are allowable at least as depending from allowable claim 22.

Claim 27 differs in scope from allowable dependent claims 11 and 17. However, the above arguments directed to allowable claims 11 and 17 are sufficiently applicable to claim 27 as to make repetition unnecessary. Thus, for each of the reasons above, claim 27 is believed to be additionally allowable independently of base claim 22 and intervening claims 25-26 as reciting an electronic circuit having a processor that is further coupled to receive from a flight management computer a signal representative of the aircraft's <u>intended</u> or <u>future</u> phase of flight at or about coincidence with a weather condition, and the processor generating a warning signal as a function of the intended phase of flight.

As discussed above in connection with allowable claims 11 and 17, Frank only discloses the onboard descent (DES) light 56 that <u>only</u> **indicates** the flight mode of the onboard performance management system computer 26. Column 13, lines 57-60 (reprinted above). As also discussed above, Kuntman only teaches generating a warning as a function of whether the wind

shear detection device is activated or de-activated. Thus, Kuntman does not disclose or suggest any activity as a function of an intended or future phase of flight, as recited in claim 27.

For at least the above reasons, claim 27 is allowable independently of allowable base claim 22 and intervening claims 25-26.

Claim 29 differs in scope from all of allowable claims 1, 13, 20 and 22. However, the above arguments directed to allowable claims 1, 13, 20 and 22 are sufficiently applicable to claim 29 as to make repetition unnecessary. Thus, for each of the reasons above, claim 29 is believed to be allowable over the combination of Otsuka, et al., Frank and Kuntman.

Claims 30-38 are allowable at least as depending from allowable claim 29.

Claim 32 differs in scope from allowable dependent claims 11, 17 and 27. However, the above arguments directed to allowable claims 11, 17 and 27 are sufficiently applicable to claim 32 as to make repetition unnecessary. Thus, for each of the reasons above, claim 32 is believed to be additionally allowable independently of base claim 29 and intervening claims 30-31 as reciting an electronic circuit having a processor operating a threat prediction function that is further coupled to receive a signal representative of the aircraft's intended or future phase of flight, and the threat prediction function being adapted to predict a threat to the safety of flight at coincidence with said weather cells as a function of said predicted future intensity of said weather cells and said intended phase of flight at said coincidence.

As discussed above in connection with allowable claims 11, 17 and 27, Frank only discloses the onboard descent (DES) light 56 that only **indicates** the flight mode of the onboard performance management system computer 26. Column 13, lines 57-60 (reprinted above). As also discussed above, Kuntman only teaches generating a warning as a function of whether the wind shear detection device is activated or de-activated. Thus, Kuntman does not disclose or suggest any activity as a function of an intended or future phase of flight, as recited in claim 32.

For at least the above reasons, claim 32 is allowable independently of allowable base claim 29 and intervening claims 30-31.

Claim 35 is believed to be allowable independently of allowable base claim 29 and intervening claim 34 as reciting the weather radar processor being further adapted (1) to determine two or more gradations of threat, and (2) to generate said warning signal *as a function of* the two or more *gradations* of threat. Claim 35 thus recites generating a warning as a function of different

levels of threat posed by the *combination* of the phase of flight of the aircraft and the future weather information.

As discussed above in connection with claim 1, Kuntman fails to disclose or suggest generating a wind shear warning *as a function of* phase of flight of the aircraft.

As taught by Kuntman, "Newer airborne weather radar systems have the additional capability of performing Doppler signal processing for detecting turbulence. These radar systems compare spectral bandwidth of the return signals against a threshold. *If the threshold is exceeded*, then it is assumed that the scanned area contains turbulent conditions." Column 1, lines 17-23.

The wind shear detection weather radar of Kuntman includes modifications of these standard components, as well as a Doppler signal processor and a wind shear threshold processor. Column 1, lines 35-46.

Kuntman teaches that radar Doppler information is generated by a Doppler signal processor 34, and provided to a wind shear threshold processor 36. See, generally, column 3, line 19-column 4, line 5. The wind shear threshold processor 36 calculates differences between the maximum and minimum wind velocities. "These figures are compared against thresholds for wind shear." Column 4, lines 13-17. The wind shear probabilities can be divided into mild, moderate and severe wind shear probabilities. Column 4, lines 17-20.

However, as taught by Kuntman, a display/alert 32 is generated any time a severe wind shear probability is detected. Column 4, lines 27-29. Thus, Kuntman fails to disclose or suggest generating a warning signal *as a function of* the two or more *gradations* of threat, as recited in claim 35.

Furthermore, Kuntman clearly teaches determining grades of threat as a function only of the "wind shear probabilities." Thus, as discussed above, Kuntman fails to disclose or suggest consideration of phase of flight. Therefore, Kuntman cannot disclose or suggest determining gradations of threat as a function of phase of flight, as recited in claim 35.

Rather, as discussed above, the wind shear detection function of Kuntman is either activated or de-activated. Once activated, the wind shear detection function only determines level of threat as a function of intensity of wind shear, not phase of flight. For example, Kuntman teaches comparing differences between the maximum and minimum wind velocities against thresholds for wind shear. Column 4, lines 13-17. In a preferred embodiment, values of 10, 20 and

30 knots are used for typical thresholds indicating mild, moderate and severe wind shear probabilities. Thus, it is the difference between the maximum and minimum wind velocities that Kuntman uses to determine whether to annunciate the display/alert 32, not the phase of flight, as recited in the claims of the present invention.

Thus, for at least the reasons above, claim 35 is believed to be allowable independently of allowable base claim 29 and intervening claim 34.

The claims being in form for allowance, reconsideration and allowance is respectfully requested.

(9) APPENDIX

An appendix containing a copy of the claims involved in the appeal is attached.

The claims being in form for allowance, consideration and allowance is respectfully requested.

This Appeal Brief being filed within two months from the filing notice of appeal under 37 CFR §41.31 or on the next succeeding day which is not a Saturday, Sunday, or a Federal holiday, as specified in 37 CFR §1.7, this Appeal Brief is believed to be timely filed.

If the Board of Patent Appeals and Interferences has questions or wishes to discuss any aspect of the case, the Board is encouraged to contact the undersigned at the telephone number given below.

Respectfully submitted,

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APPENDIX

Claim 1: A method for predicting the future state of a weather condition relative to an aircraft, the method comprising:

accessing a first weather radar image generated relative to the aircraft;

accessing a second weather radar image generated after said first weather radar image and having a similar relationship to the aircraft as said first weather radar image;

mapping said first weather radar image onto said second weather radar image;

comparing said first and second weather radar images;

forecasting information describing a weather condition represented by said first and second weather radar images;

retrieving a phase of flight of the aircraft; and

generating a warning as a function of comparing said forecast information describing a weather condition and said phase of flight.

Claim 3: The method recited in claim 1, wherein said forecasting information describing a weather condition represented by said first and second weather radar images further comprises forecasting an intensity of a storm cell sufficient to threaten safety of flight; and

said comparing said forecast information describing a weather condition and said phase of flight further comprises generating a warning as a function of a predicted intersection with said storm cell threatening said safety of flight.

Claim 4: The method recited in claim 1, wherein said generating a warning as a function of said forecast information describing a weather condition and said phase of flight further comprises determining a coincidence of the aircraft and said weather condition.

Claim 5: The method recited in claim 4, wherein determining a coincidence of the aircraft and said weather condition further comprises retrieving a flight path of the aircraft and comparing said flight path with a location of said weather condition.

Claim 6: The method recited in claim 5, wherein said retrieving a phase of flight of the aircraft further comprises retrieving an intended phase of flight at said coincidence of the aircraft and said weather condition; and

said generating a warning as a function of said forecast information describing a weather condition and said phase of flight further comprises generating a warning as a function of said forecast information describing a weather condition and said intended phase of flight at said coincidence.

Claim 7: The method recited in claim 6, wherein said generating a warning further comprises generating a warning as a function of determining an intensity of said weather condition at said coincidence; and

comparing said intensity of said weather condition **with** said intended phase of flight at said coincidence.

Claim 8: The method recited in claim 1, wherein said forecast information further comprises information describing a track of said weather condition.

Claim 9: The method recited in claim 8, further comprising:

accessing a flight path of the aircraft;

comparing said forecast track of said weather condition with said flight path; and

predicting a coincidence of said flight path and said weather condition.

Claim 10 (original): The method recited in claim 9, further comprising generating an alert as a function of said coincidence of said flight path and said weather condition.

Claim 11: The method recited in claim 3, wherein said comparing said forecast information describing a weather condition and said phase of flight further comprises determining a threat to the safety of flight as a function of said forecasted intensity of said storm cell storm cell as a function of an intended phase of flight of the aircraft at said predicted intersection with said storm cell.

Claim 12: The method recited in claim 8, wherein:

said forecasting information describing a weather condition further comprises forecasting a weather radar image representative of said weather condition relative to the aircraft; and

said displaying information describing said forecast track of said weather condition further comprises displaying said forecast weather radar image.

Claim 13: A method for predicting the future position and intensity of a weather condition relative to an aircraft using a weather radar resident on-board the aircraft, the method comprising:

recording a first weather radar image generated by an onboard weather radar;

recording a second weather radar image generated after said first weather radar image;

spatially and temporally mapping said first weather radar image onto said second weather radar image;

predicting a future track of a weather condition as a function of said first and second weather radar images;

displaying said predicted future track of said weather condition;

retrieving a phase of flight of the aircraft; and

determining a potential threat to the safety of flight and a severity of said potential threat as a function of comparing said weather condition and said phase of flight.

Claim 14: The method recited in claim 13, further comprising:

retrieving a stored flight path of the aircraft;

comparing said flight path with said predicted future track of said weather condition; and

determining a coincidence of said flight path and said weather condition.

Claim 15: The method recited in claim 14, further comprising generating a warning as a function of said coincidence of said flight path and said weather condition.

Claim 16: The method recited in claim 15, wherein:

each of said first and second weather radar images further comprise respective first and second images representative of said weather condition;

said comparing said first and second weather radar images further comprises comparing first and second states of said weather condition; and

forecasting a future state of said weather condition.

Claim 17: The method recited in claim 16, wherein:

said retrieving a phase of flight of the aircraft further comprises retrieving an intended phase of flight of the aircraft at said coincidence of said flight path and said weather condition; and

said determining a potential threat to the safety of flight further comprises determining a potential threat to the safety of flight as a function of said future state of said weather condition and said intended phase of flight.

Claim 18: The method recited in claim 17, wherein said generating a warning is further a function of said potential threat to the safety of flight.

Claim 19: The method recited in claim 18, wherein said displaying said predicted future track of said weather condition further comprises displaying one or more of a future position and a future intensity of said weather condition.

Claim 20: A method for using an electronic circuit to predict the future position and intensity of a weather condition relative to an aircraft using a weather radar resident on-board the aircraft, the method comprising:

recording a first weather radar image generated by an onboard weather radar;

recording a second weather radar image generated at a time after said first weather radar image;

accessing said first and second recorded weather radar images;

with the electronic circuit, referencing said first and second recorded weather radar images to a common physical location;

with the electronic circuit, analyzing said first and second weather radar images;

with the electronic circuit, predicting a future track of one or more weather cells as a function of said analyzing said first and second weather radar images;

with the electronic circuit, generating a signal representative of said predicted future track of said one or more weather cells;

displaying said predicted future track of one or more of said weather cells;

with the electronic circuit, accessing an intended flight path of the aircraft;

with the electronic circuit, accessing a phase of flight of the aircraft;

with the electronic circuit, predicting a coincidence of said intended flight path and said weather condition; and

with the electronic circuit, determining a potential threat to the safety of flight as a function of comparing said coincidence of said intended flight path, said phase of flight, and said weather condition.

Claim 21: The method recited in claim 20, wherein said predicting a coincidence of said intended flight path and one or more of said weather cells further comprises with the electronic circuit, comparing said predicted future track of one or more of said weather cells with said intended flight path.

Claim 22: An electronic circuit for use with a weather radar system to predict the future state of a weather condition relative to an aircraft, the electronic circuit comprising:

a memory for storing a plurality of machine instructions;

a processor coupled to receive a signal representative of a phase of flight of the aircraft and further coupled to said memory for accessing said plurality of machine instructions, said processor accessing a phase of flight of the aircraft and executing said plurality of machine instructions to implement a plurality of functions, said functions comprising:

a) accessing a first weather radar image generated relative to the aircraft;

b) accessing a second weather radar image generated after said first weather radar image and having a similar relationship to the aircraft as said first weather radar image;

c) referencing said first weather radar image to said second weather radar image;

d) comparing said first and second weather radar images;

d) forecasting as a function of said first and second weather radar images information describing a weather condition represented by said first and second weather radar images; and

e) generating a warning as a function of comparing said phase of flight and said information describing a weather condition represented by said first and second weather radar images.

Claim 23: The electronic circuit recited in claim 22, wherein said plurality of functions further comprises generating a video signal representative of said forecast weather condition information.

Claim 24: The electronic circuit recited in claim 22, wherein:

said processor is further coupled to receive from a flight management computer a signal representative of the aircraft's intended flight path;

said forecasting information describing a weather condition further comprises forecasting a future track of said weather condition; and

said plurality of functions further comprises:

comparing said forecast track of said weather condition with said intended flight path; and

predicting a coincidence of said intended flight path and said weather condition.

Claim 25: The electronic circuit recited in claim 22, wherein said forecasting information describing a weather condition further comprises forecasting a state of said weather condition at or about said coincidence.

Claim 26: The electronic circuit recited in claim 25, wherein said generating a warning further comprises generating a warning signal as a function of said coincidence, said phase of flight, and said state of said weather condition at or about said coincidence.

Claim 27: The electronic circuit recited in claim 26, wherein:

said processor is further coupled to receive from a flight management computer a signal representative of the aircraft's intended phase of flight at or about said coincidence; and

wherein said generating a warning signal is further a function of said intended phase of flight.

Claim 28: The electronic circuit recited in claim 27, further comprising a weather radar unit coupled to said processor.

Claim 29: An electronic circuit for coupling to a weather radar system on-board an aircraft to display weather information and forecast weather data relative to a phase of flight of the aircraft, the processor comprising:

a weather radar processor adapted to receive first and second weather radar return signals from a receiver portion of a weather radar system resident on-board an aircraft and convert said first and second weather radar return signals into first and second weather radar image signals representative of weather information relative to said aircraft contained in said weather radar return signals;

a memory coupled to said processor and adapted to receive and store said first and second weather radar image signals;

a weather incident prediction function operated by said processor and coupled to said memory to receive first and second different ones of said stored weather radar image signals, said weather incident prediction function adapted to forecast future weather information relative to said aircraft as a function of said first and second stored weather radar image signals, and generate a signal representative of said future weather information; and

a threat prediction function operated by said processor and coupled to receive a signal representative of a phase of flight of the aircraft and said signal representative of said future weather information, said threat prediction function adapted to compare said future weather information and said phase of flight and predict a threat to the safety of flight as a function of said comparison.

Claim 30: The electronic circuit recited in claim 29, wherein:

said storage of said weather radar image signals is further a function of time; and

said forecast of future weather information relative to said aircraft is further a function of said time.

Claim 31: The electronic circuit recited in claim 30, wherein said future weather information further comprises information describing both a predicted future intensity and a predicted future track of one or more weather cells described by said weather information contained in said weather radar return signals.

Claim 32: The electronic circuit recited in claim 31, wherein:

said signal representative of a phase of flight of the aircraft further comprises a signal representative of an <u>intended</u> phase of flight of the aircraft;

said weather radar processor is further adapted to receive a signal representative of an intended flight path of said aircraft;

said weather incident prediction function is further adapted to predict a coincidence of said intended flight path and one or more of said weather cells; and

said threat prediction function is further adapted to predict said threat at said coincidence as a function of said predicted future intensity of said one or more of said weather cells and said intended phase of flight at coincidence.

Claim 33: The electronic circuit recited in claim 31, wherein:

said weather radar processor is further adapted to receive a signal representative of an intended flight plan of said aircraft; and

said weather incident prediction function is further adapted to predict a coincidence of said intended flight plan and one or more of said weather cells.

Claim 34: The electronic circuit recited in claim 29, wherein said weather radar processor is further adapted to generate a warning signal as a function of said threat prediction function.

Claim 35: The electronic circuit recited in claim 34, wherein said weather radar processor is further adapted to determine two or more gradations of threat and to generate said warning signal as a function of said two or more gradations of threat.

Claim 36: The electronic circuit recited in claim 29, further comprising a display coupled to said processor and adapted to receive each of said weather radar image signals representative of weather information contained in said weather radar return signals and said signal representative of said future weather information, said display comprising a screen adapted to display each of said weather information contained in said weather radar return signals and said future weather information.

Claim 37: The electronic circuit recited in claim 36, wherein said processor is further adapted to generate weather radar transmission signals; and further comprising:

a transmitter coupled to receive said weather radar transmission signals from said processor and output said weather radar transmission signals to a radar antenna; and

a receiver coupled to receive weather radar return signals from a radar antenna and output said received weather radar return signals to said processor.

Claim 38: The electronic circuit recited in claim 29, wherein said threat prediction function is further adapted to determine a severity of said threat to the safety of flight as a function of said comparison of said future weather information and said phase of flight.

PTO/SB/17 (10-03)
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500

Complete if Known	
Application Number	10/823,951
Filing Date	April 13, 2004
First Named Inventor	Frank W. Daly, Jr.
Examiner Name	2857
Art Unit	Anthony Gutierrez
Attorney Docket No.	543-99-036 CIP

METHOD OF PAYMENT (*check all that apply*)

☐ Check ☒ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number:
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The Director is authorized to: (*check all that apply*)

☐ Charge fee(s) indicated below ☐ Credit any overpayments
☐ Charge any additional fee(s) or any underpayment of fee(s)
☐ Charge fee(s) indicated below, except for the filing fee
to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below		Fee Paid
Total Claims	-20** =		X		=	
Independent Claims	- 3** =		X		=	
Multiple Dependent					=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	500
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) ________

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 500

SUBMITTED BY

(Complete (*if applicable*))

Name (*Print/Type*)	Charles J. Rupnick	Registration No. (Attorney/Agent)	43,068	Telephone	206-439-7956
Signature	*[signature]*			Date	December 19, 2005

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